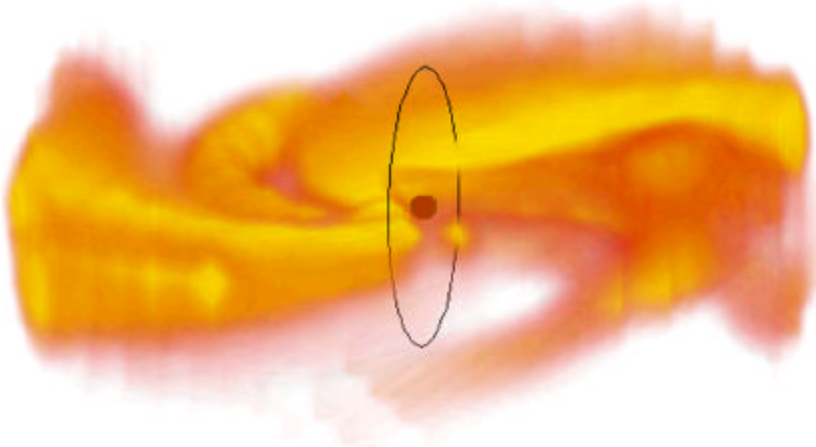




# **Solar Polar Imager**

## **Mission Concept Summary**

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*The first observation of the Sun from above the poles will provide valuable information concerning the solar cycle, solar activity, the 3-D structure of the dynamic solar corona and solar wind, and even space weather.*

### **Technology**

- Solar Sail propulsion
- Lightweight subsystems and instruments
- High-rate telemetry from deep space
- AI event selection and spacecraft autonomy

### **Fundamental Question:**

How do the polar regions of the Sun affect the dynamics of the global corona and reveal the secrets of the solar cycle?

### **Science Objectives:**

- Examine solar and coronal structures from a revealing new polar perspective
- Image global effects of dynamic events on a full 3-D structure of the corona
- Track the complete life cycle of active regions and coronal holes
- Link variations in the high-latitude heliosphere to surface conditions
- Make pioneering measurements of the Sun's evolving polar magnetic field
- Refine solar dynamo theory by using measurements of subsurface polar motions
- Measure angular momentum loss in the solar wind

### **Mission Description:**

- Circular 0.5-AU 90° solar orbit in 3:1 Resonance with Earth
- 30° to 150° separation from Earth to complement space weather program
- Solar array-powered three-axis or spin-stabilized platform
- Lightweight spacecraft with solar sail propulsion
- Minimum 2 years in final orbit, spanning the time of solar polar field reversal

### **Measurement Strategy**

- Image Corona and Inner Heliosphere From Over Poles
- Reconstruct 3-D structure of coronal mass ejections (CMEs) from Sun to 1 AU
- Measure high latitude magnetic fields and coronal Holes
- Determine surface velocity for local helioseismology
- Gather In-situ particle and field measurements
- Measure solar irradiance from a new perspective